12 de Febrero de 2026

10.30 h, Salón de Grados
Facultad de Ciencias

Neutron Scattering as a Tool to Study Complex Spin Textures .

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Understanding the complex magnetic microstructure of materials, and its connection to bulk magnetic behavior, relies on the combined strengths of experimental observation and computational modeling. Among available techniques, magnetic small-angle neutron scattering (SANS) is particularly powerful, providing access to intricate spin textures on mesoscopic length scales (~1-1000 nm) and within the bulk of magnetic media [1]. Extensive SANS studies have revealed a wide variety of nonuniform spin configurations in nanostructured magnets, ranging from quasi-uniform and canted states to vortex-like and core-shell-type arrangements [1], illustrating the rich diversity of nanoscale magnetic textures. In parallel, micromagnetic simulations have become indispensable for predicting mesoscale spin structures and their associated scattering signatures. These simulations account for particle size and shape, defects, and competing magnetic interactions that determine the ground states of nanoparticles. In this talk, we discuss the neutron-scattering signatures of dipolar-energy-driven vortex states in magnetic nanoparticles [2]; examine the influence of the Dzyaloshinskii□Moriya interaction [3] and surface anisotropy [4]; highlight characteristic features arising from hopfion textures [5]; and report the experimental observation of a recently predicted spin-disorder-induced angular anisotropy in the polarized neutron-scattering cross section [6].

References

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